Supplemental Cruise Plan

Benthic Survey of the Gray's Reef National Marine Sanctuary and Nearby Shelf Waters, Spring 2002

1. Contact Information:

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2. Objectives and Scope:

The purpose of this supplemental cruise to the Gray's Reef National Marine Sanctuary (GRNMS) is to complete the sampling initiated April 3 – 10, 2002 aboard the NOAA ship FERREL as part of an ongoing ecological characterization of GRNMS. An important goal of the current survey is to determine the extent to which land-based pollutants and other materials are transported through river systems to the offshore shelf environment, inclusive of GRNMS, and the potential effects these materials may have on biological resources along the way.

Due to severe weather during the original sampling time frame only 13 of the 20 planned stations (Table 1, Fig. 1) were completed. Completed stations include: 9 stations along the Sapelo Transect (22, 23, 24, 24, 35, 36, 37, 38, 39) and 4 stations along the Doboy Transect (27, 28, 29, 12). While the cruise was successful in that the completed stations will allow us to address the key study objectives, we are returning to the GRNMS to sample the remaining 7 stations by implementing a slight modification to the sampling design. Five of the remaining 7 stations are seaward of GRNMS and would require the use of the NOAA ship FERREL or similar NOAA research vessel which is not available. Instead, we will resample 5 stations within GRNMS previously sampled in 2000 and 2001 (Table 2) thereby examining annual variability in benthic fauna and contaminant levels within the sanctuary over a three-year period (3 separate annual sampling points). Understanding such natural temporal (short-term annual) variability will be invaluable in future efforts to detect potential long-term changes attributable to human disturbances or extreme natural events. Additionally, we will sample the two inshore stations (21 and 26) that were too shallow for the FERREL. We will accomplish the task of sampling the two inshore stations and 5 stations within GRNMS by returning in late May 2002 using a 25 ft. trailerable research vessel as the sampling platform.

3. Field Logistics

Scientists from Center for Coastal Environmental Health and Biomolecular Research will conduct the benthic sampling during the week of May 21-24, 2002. Work will be staged out of Darien, Georgia. The NOAA scientific crew from Charleston, consisting of three members, will arrive in Darien on Tuesday, May 21 trailering a 25 ft. NOAA boat. Sampling will begin the next day and will be conducted from the NOAA vessel. Sampling should be completed by Friday, May 24. Five of the seven stations are located approximately 20 nm offshore and the completion of these stations is highly dependent upon the weather (seas must be 3 feet or less offshore). If sea conditions are not suitable for sampling the week of May 21-24, sampling will be delayed until May 28-31, 2002.

4. Scientific Approach

At each of the 7 stations, samples will be obtained for characterization of: (1) biodiversity and abundances of macroinfauna (> 0.5 mm); (2) concentration of sediment contaminants (metals, pesticides, PCBs, PAHs); (3) general habitat conditions (water depth, dissolved oxygen, salinity, pH, temperature, % silt-clay versus sand content of sediment, organic-carbon content of sediment); and (4) aesthetic quality (presence of anthropogenic debris, visible oil, noxious sediment odor, and water clarity based on secchi depths).

Depth and water-quality parameters (dissolved oxygen, temperature, pH, and salinity) will be measured with a "Datasonde" multiprobe data logger. Benthic macroinfauna will be sampled in triplicate with a 0.04-m^2 Young grab. Benthic samples will be sieved through a 0.5-mm screen and preserved in 10% buffered formalin (with Rose Bengal stain added to facilitate subsequent sorting in the laboratory). Samples for the analysis of sediment contaminants, % silt-clay, % water, and % total organic carbon (TOC) will be sub-sampled from composited surface sediment (upper 2-3 cm) collected from additional multiple grabs independent of the macroinfaunal grabs.

Summaries of these parameters and corresponding sampling protocols are given in Tables 3 and 4. Quality-control tolerance ranges for Datasonde instrument calibrations and field measurements are provided in Table 5. Standard Field Sheets for recording and tracking information at each station will be used and will be provided prior to cruise departure.

Estimated time to complete the above work at each station is 1 hour.

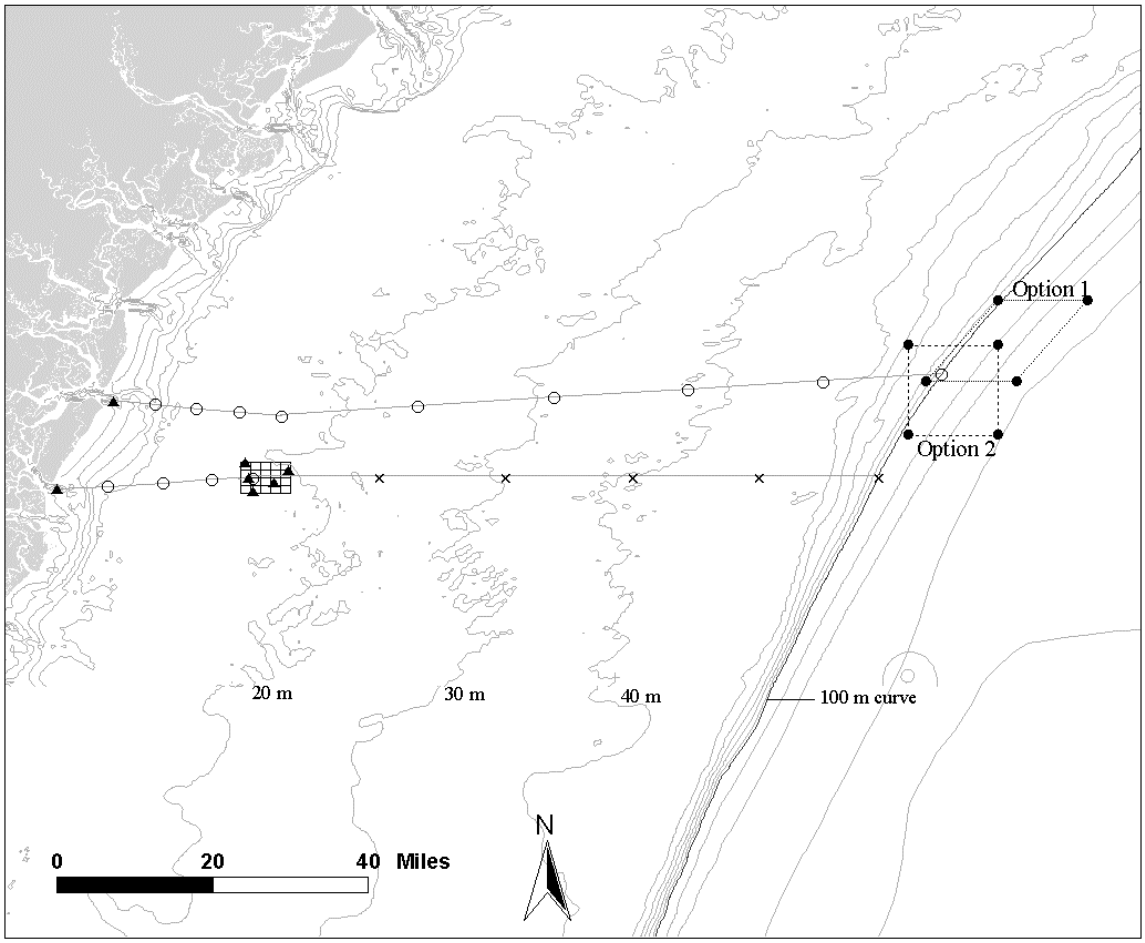

Figure 1. Study area and sampling sites for the spring 2002 benthic survey at GRNMS and nearby shelf waters (NOAA Ship FERREL Cruise FE-02-09-MA). Boxes labeled "Option 1" and "Option 2" refer to adjacent areas that the Southeast Fisheries Management Council is considering as candidates for Marine Protected Area (MPA) status. O - Stations successfully sampled during April 2002 benthic survey. X – Stations not sampled due to severe weather during April 2002 benthic survey. ▲ - Stations to be sampled during return trip in May 2002.

Table 1. Locations of sampling sites for spring 2002 benthic survey at GRNMS and nearby shelf waters. Transect I = Sapelo Sound transect. Transect II = Doboy Sound transect.

Station	Transect	Latitude		Longitude		Approx. distance from land (nm)
21*	I	31°	31.9000	-81°	9.4500	1
22	I	31°	31.5100	-81°	4.5900	5
23	I	31°	30.9700	-81°	0.0000	9
24	I	31°	30.6000	-80°	55.3100	13
25	I	31°	30.2100	-80°	50.6000	17
35	I	31°	31.2180	-80°	35.4000	29
36	I	31°	32.1840	-80°	20.4000	41
37	I	31°	33.1200	-80°	5.4000	54
38	I	31°	34.0260	-79°	50.4000	66
39	I	31°	34.8000	-79°	37.200	77
26*	II	31°	22.2000	-81°	15.7300	1
27	II	31°	22.5300	-81°	9.8500	5
28	II	31°	22.8900	-81°	3.7900	9
29	II	31°	23.2000	-80°	58.3100	13
12	II	31°	23.3600	-80°	53.7800	17
40^	II	31°	23.3598	-80°	39.7398	30
41^	II	31°	23.3598	-80°	25.6860	42
42^	II	31°	23.3598	-80°	11.6460	54
43^	II	31°	23.3598	-79°	57.6000	66
44^	II	31°	23.3598	-79°	44.2800	77

* Unable to sample because too shallow for the NOAA ship FERREL, will return to sample at later date.
^ Unable to sample due to severe weather.

Table 2. Locations of the five benthic sampling sites within GRNMS boundaries at the seaward end of Transect II (refer to Table 1).

Station ID	Latitude (deg.)	Latitude (min.)	Longitude (deg.)	Longitude (min.)
1	31	25.16894	-80	54.73736
10	31	24.33443	-80	49.94133
11	31	23.46176	-80	54.34569
14	31	22.98005	-80	51.58678
17	31	22.05454	-80	53.86067

Table 3. Summary of field samples collected at each station.

Parameters	# Replicates	Container Type	Sample Size	Preservation
Infauna	3 (0.04 m^2 Young grab, 0.5 mm sieve)	500 ml Polypropylene jar	All material retained on 0.5 mm sieve	10% buffered formalin in field. Transferred to 70% ethanol within ~ 1 month.
Metal Contaminants	1 (Composited upper 2 cm of sediment from multiple grabs.)	250 ml HDPE jar	2/3 Full	Frozen (-20°C).
Organic Contaminants	1 (Composited upper 2 cm of sediment from multiple grabs.)	500 ml I-Chem glass jar	2/3 Full	Frozen (-20°C).
TOC	1 (Composited upper 2 cm of sediment from multiple grabs.)	125 ml Polypropylene jar	2/3 Full	Frozen (-20°C).
Silt-Clay & % Moisture	1 (Composited upper 2 cm of sediment from multiple grabs.)	500 ml HDPE jar	2/3 Full	Frozen (-20°C).

Table 4. Summary of in-situ measurements collected at each station.

- Station depth (boat fathometer)
- Presence of surface debris
- Visible Oil (on sea surface, in bottom sediment grabs)
- Noxious odors in sediment grabs (H_2S, sewage, oil)
- Visible appearance of grabs (sediment color, sediment type, visible biota)
- Secchi depth
- DataSonde instantaneous profiles (depth, temperature, salinity, pH, DO, conductivity)
  - Surface
  - Near-bottom